NUTRITION IN PLANTS

1
CHAPTER

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- **Mechanism of Photosynthesis**
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Plants play role of producers in nature. are producers, which produce food for all living organic. They utilize sun's radiant energy & convert into chemical energy. In this way, they also plays role of converter. Plants use sunlight in photosynthesis. During photosynthesis in the presence of sunlight CO_2 & H_2O convert in to carbohydrate & O_2 molecules.

MECHANISM OF PHOTOSYNTHESIS

$$6CO_2 + 6H_2O \xrightarrow[\text{Chlorophyl}]{\text{Light}} C_6H_{12}O_6 + 6O_2$$

◈ **Steps of photosynthesis :**

- Chlorophyll traps the sunlight.
- CO_2 & water molecule used as raw material.
- Now the chlorophyll convert the raw material into carbohydrate.
- Oxygen is generated as a by product in this process.

REQUIREMENT OF PHOTOSYNTHESIS

Green plants need the following things to prepare their own food :

- **Carbon Dioxide :** Plants take up carbon dioxide from the atmospheric air through stomata present on the undersurface of the leaves. Guard cells around stomata regulate their opening and closing.
- **Chlorophyll :** It is the green pigment presents in the leaf. The green colour of leaves is due to the presence of chlorophyll. It is usually present in special cell organelle called **chloroplast.** Chlorophyll captures solar energy during photosynthesis.
- **Sunlight :** Sunlight comes from the sun. It is essential as it provides the energy required for the reaction.
- **Water and Minerals :** Roots of the plants absorb water along with minerals from the soil and transport them to the leaves for photosynthesis.

SITE OF PHOTOSYNTHESIS

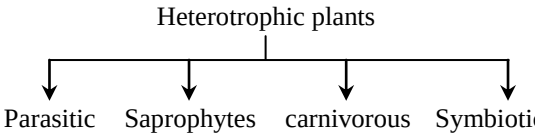
Photosynthesis occurs in the chlorophyll of leaves & sometimes in the stem which are green in colour.

◈ **Importance of photosynthesis :**

- It is primary source of food production for all other living organisms.
- It maintain balance oxygen & CO_2 in the atmosphere.

NUTRITION IN NON GREEN PLANTS

Non green plants like bacteria & fungi do not contain chlorophyll. So they cannot prepare their food by photosynthesis. These types of plants are heterotrophic plants.



(1) Parasites : Plants which depends on other living organism for their nutritional requirement known as parasitic plants. Dodder (Amarbel) is a plant parasite which produces special sucking roots called haustoria. For absorption of food from the host plant.

(2) Saprophytes : Plants which depends on dead organic matter for their nutrition, known as saprophytic plants. For example – Bacteria & fungi.

(3) Carnivorous & insectivorous plants : Some plants also take food just like animals. Their food consists of small insects. For example – Pitcher plants.

In a pitcher plant leaf is modified into a pitcher like structure when any insects sits on it, the lid is closed & the insect is trapped in pitcher. It is then digested by the secretion of enzymes.

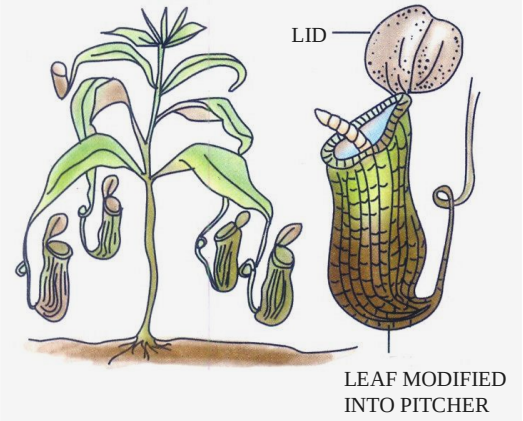


Figure : Pitcher leaves are modified to capture insects

(4) Symbiosis : It is a partnership between two organisms in which both partner get benefited from each other.

For example : Lichen.

Lichen is a combination of an alga & a fungus. In which, the fungus provides water & minerals to the alga whereas the alga supplies organic food to fungus.

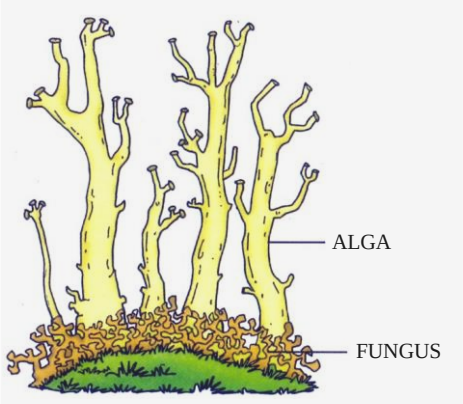


Figure : Lichen

HETEROTROPHIC NUTRITION IN ANIMAL

Animals and non-green plants like fungi, etc. cannot manufacture their own food. For their food, they depend upon green plants, directly or indirectly. Therefore, they are called heterotopous and their mode of nutrition is known as heterotrophic nutrition.

All animals are divided into three categories on the basis of their eating habits :

- **Herbivorous Animals :** Animals which feed directly on plants are called herbivorous animals or herbivores. Examples are cow, buffalo, goat, etc.
- **Carnivorous Animals :** Animals which eat the flesh of other animals are called carnivorous animals or carnivores. Examples are lion, tiger, etc.
- **Omnivorous Animals :** Animals which eat both plants and flesh of other animals are called omnivorous animals or omnivorous. Examples are human beings, pig, crow, cockroach, etc.

EXERCISE # 1

A. Single Choice Type Questions

Q.1 The plant that feeds & traps on insects is -
(A) Drosera (B) Sunflower
(C) Cuscuta (D) Mango

Q.2 The green pigment in the leaves is called -
(A) Chlorophyll (B) Anthocyanin
(C) Chloroplast (D) None

Q.3 Which one of the following is a parasite ?
(A) Mushroom (B) Fungi
(C) Dodder (D) Pitcher's plant

Q.4 Rhizobium is a good example of -
(A) insectivorous (B) symbiosis
(C) parasitic (D) none of these

Q.5 Cuscuta is an example of -
(A) autotroph (B) parasite
(C) saprophyte (D) host

Q.6 Autotrophic nutrition found only in -
(A) plants (B) animals
(C) both (D) none

Q.7 The plant that feeds and traps on insects is -
(A) venus-fly trap (B) cuscuta
(C) sunflower (D) none of these

Q.8 Association of two different organisms in which both are benefited is called -
(A) symbiosis (B) nutrition
(C) saprophytic (D) parasitic

Q.9 CO_2 & O_2 balance in atmosphere is due to -
(A) Photorespiration (B) Photosynthesis
(C) Respiration (D) Leaf anatomy

B. Tick (✓) the right statement

Q.10 Animals & plants do not depend on plant for their food. **(True/False)**

Q.11 Omnivorous eats only flesh. **(True/False)**

Q.12 Sucking roots are called haustoria. **(True/False)**

Q.13 The living organism from which parasitic derives its food called host. **(True/False)**

C. Match the column A with column B

Q.14

Column A	Column B
(a) Amarbel	(i) Saprophytes
(b) Rhizobium	(ii) Insectivorous
(c) Mushroom	(iii) Autotrophs
(d) Drosera	(iv) Stomata
(e) Green plants	(v) Symbiosis
	(vi) Parasite

D. Fill in the blank

Q.15 _____ & _____ are insectivorous plants.

Q.16 Green plants use _____, _____ & _____ to make food.

Q.17 Lichen is the mutual combination of _____ & _____.

Q.18 Doddar is an example of _____ .

EXERCISE # 2

A. Very Short Answer Types Questions

Q.1 What is the meaning of autotrophic nutrition ?

Q.2 What is symbiotic relationship ?

Q.3 What are producers ?

Q.4 Which type of nutrition is found in Doddar ?

Q.5 Write down the equation of photo synthesis ?

Q.6 What is the meaning of 'nutrition' ?

Q.7 How do algae & fungi benefit each other ?

B. Short Answer Types Questions

Q.8 What are insectivores ? Name an insectivorous plant ?

Q.9 What is photosynthesis ?

Q.10 What factors are essential for photosynthesis ?

Q.11 How do plants exchange gases with the atmosphere ?

Q.12 Name the 3 groups of animals on the basis of their eating habits ?

Q.13 Write the meaning of following terms– herbivores, carnivores & omnivores.

C. Long Answer Types Questions

Q.14 How do you show that chlorophyll is necessary for photosynthesis ?

Q.15 Describe symbiotic mode of nutrition with an example ?

Q.16 How dodder takes their nutrients from the host ?

Q.17 Describe the methods of nutrition in non green plants ?